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# SOCIETY OF ARTS.

FRIDAY, NOVEMBER 4th, 1853.

## MEETING OF COUNCIL.

Wednesday, Nov. 2nd., 1853.

At a Meeting of Council, held on Wednesday, the 2nd inst., the following Institutions were taken into Union :

- 298. Hampton (Middlesex), Literary Society.
- 299. Hereford, Permanent Library.

## NOTICE TO INSTITUTIONS.

As the time is now approaching for the receipt of the book-orders, the Secretary to the Society of Arts would be particularly obliged by the different local Secretaries adhering strictly to the instructions given in the Circular, dated Oct. 13th, accompanying the table of the rates of discount to be allowed by the Publishers. It is obvious, that, unless one uniform plan is followed, there would be much confusion and unnecessary labour ; and it is hoped that all parties will assist in making the arrangement as practically serviceable as possible.

## PRACTICAL OBSERVATIONS ON SURVEYING AND LEVELLING.

By THOMAS SOPWITH, F.R.S.

### INTRODUCTION.

A few years ago several schoolmasters formed themselves into a local society, chiefly connected with Northumberland, Durham, and Newcastle-on-Tyne (three separate *counties*), for the purpose of holding quarterly meetings, and having papers read and discussed on matters relating to Education. This Society having expressed a wish (16th February, 1848) to receive from Mr. Sopwith some information on the subject of surveying and levelling, he accordingly drew up the following paper.

Mr. Sopwith's object was to divest the subject of much of the laborious prolixity and antiquated style which hung over it, as usually treated ; to infuse a new occupation into schools ; and to afford general information on a subject too little known, especially by barristers. The understanding of models, plans, and sections, by Judge, Counsel, and Jury, is at times of the most serious importance in the determination of questions of enormous value ; and to each and every one a correct eye for maps, plans, and diagrams, is of constant usefulness.

The Council wish to take this opportunity of thanking Mr. Sopwith for his communication,—which is the more valuable at the present time from the fact of the strenuous efforts now being made to introduce into ordinary school education objects of practical utility. It is gratifying to reflect that a gentleman of Mr. Sopwith's distinguished attainments, and whose professional avocations are so onerous, can yet find time, and have the inclination, to aid in advancing the general spread of knowledge throughout the country.—*Sec. Soc. of Arts.*

IN an admirable address, recently delivered by the Dean of Durham to the members of the Gateshead Mechanics' Institution, it is truly observed, that education, properly so called, is not limited to boyhood or youth ; it ends not at twelve, or thirteen, or twenty years of age,—“ the wise man's education ends only with his life.” It is the province of the schoolmaster only to commence the course of that comprehensive education, which extends through life—to sow the seeds of future acquirement, and to embrace, as far as possible, the various objects which may prove of future benefit to the pupil. This enlightened view of education is daily becoming more general. The teacher, looking beyond what have hitherto been deemed the rudiments of education,—which, indeed, in many schools rarely went beyond a moderate proficiency in reading, writing, English grammar, and arithmetic ; has now, in many instances which have come within my own observation, included the study of natural history, and of many sciences, a knowledge of which, rightly directed, cannot fail to be of essential service in after life. A few weeks ago I visited a school in Edinburgh, where, amongst the humblest class of scholars, were found boys capable of explaining the action of the air-pump, locomotive engine, &c. ; and I know that in this town philosophical and scientific apparatus have been extensively applied in the service of education. The request which has been made to me by the members of the Society whom I have now the honour to address, is an evidence of the desire which prevails to add to the practical character of the instruction imparted in the ordinary schools of the district ; and as education extends throughout life, so may it in early life very properly embrace whatever is likely to be useful in future and more advanced years.

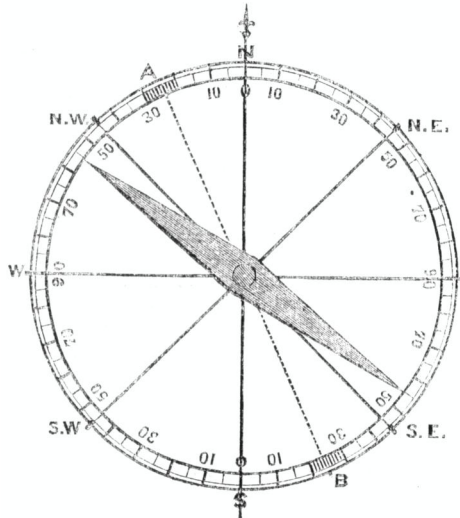
Plain surveying has been included as a branch of education in many schools, and has formed the subject of various books written expressly for the use of schools. Levelling has been less generally taught, but its general principles have received ample illustration in various able works with which intelligent teachers are well acquainted. In endeavouring to comply with the request which this Society has done me the honour to make, it will be my aim to present such general views as are adapted to the present times, and are at the same time within the scope of ordinary tuition,—to offer some observations on the use and advantages of the practice of surveying and levelling,—to describe the elementary branches of knowledge required by the student in this department, and to bring the general subject into as condensed and explanatory a form as is consistent with the brief period to which I am limited on the occasion of your meeting in this place.

In the first place, then, I may observe, that surveying and levelling have within the last twenty years acquired a place in public estimation far exceeding that which previously obtained when most of the works to which I have alluded were composed. The railway system, which has wrought so many changes, has given a great additional value to the art of surveying and levelling, which indeed has sprung up from comparative obscurity to be a lucrative profession : and here I think it by no means out of place to observe, that it was from my *schoolmaster* (Mr. Henry Atkinson, of this town), that I first obtained a knowledge of the practice as well as the principles of surveying. I mention this, because it gives force to what I have to urge on this Society,—that important and valuable results in after life may flow from such practical education in the arts and sciences ; and the more such proficiency is required, so much the more important is it to prepare youth for acquiring it. At the close of

this paper, I purpose, in a recapitulation of the subjects now to be brought under consideration, to show how generally such a knowledge may be applied with advantage alike to the teacher, the pupil, and the public.

I need scarcely observe, that as a branch of education any instructions in surveying and levelling must necessarily be preceded by a considerable proficiency in the first rudiments of learning. When the student is sufficiently advanced in ordinary reading, writing, and arithmetic, his first lessons in the departments which form the subject of this paper are to acquire the peculiar reading, writing, and arithmetic, which appertain to the practice of surveying and levelling. He is now required to "read," as the expression is, other pages and other objects than ordinary books present. To read the theodolite, levelling staff, or common scales, is only to be acquired by practice, and may form indoor lessons before attempting any practice in the field. To be able to "read" the compass, is as necessary for the surveyor as the sailor; and a series of lessons by means of appropriate diagrams would be not less entertaining than useful to young pupils, for it cannot have escaped the attention of those whom I address how much children are attracted by moveable diagrams or models. The vernier scale, for example, affords a good illustration both of the particular mode of instruction, and its general application. I would recommend that such a scale, showing, for instance, ten parts with a moveable scale of the same length divided into nine parts,\* should be exhibited in the school-room, when not only the intended pupils in surveying, but the pupils generally of more advanced classes might learn to read off divisions to the hundredth part of the space occupied,—say, one foot; and if a barometer with such a scale was within reach, the practical and popular nature of this instruction would be made apparent. In like manner the graduations on the face of the compass—on levelling staves, and on ordinary scales, are to be learned by a process of reading accompanied by proper explanations. This is really the A, B, C, of surveying and levelling. Fig. 1, represents a graduated circle, the ordinary reading of which requires no explanation; but the reading

Fig. 1.

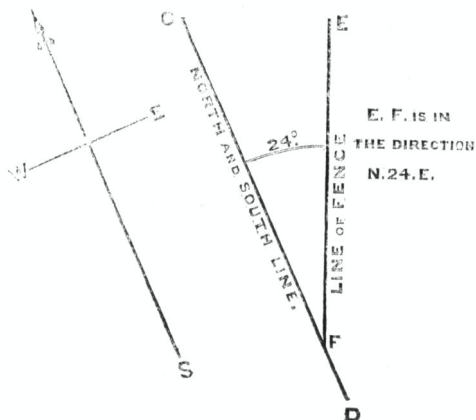


of the surveying dial is altogether different. The line

\* See Fig. 3.—Vernier of dial reading 3 seconds, 20 parts; and 20 in 10, =  $\frac{1}{50}$ th.

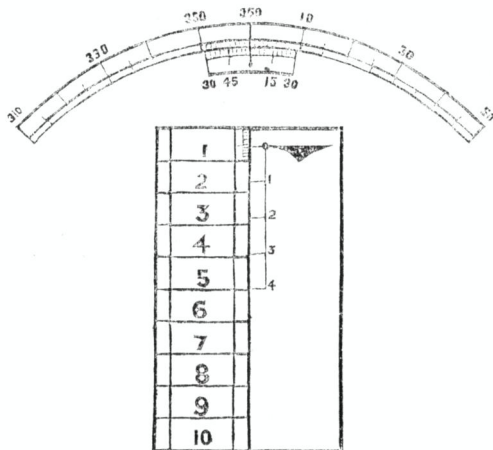
of sight in which the observation is taken, lies over the north and south line, marked N S. This is to be placed in any required direction; and being fixed, the magnetic needle is found to rest, we will suppose, in the position marked by the dotted line, A B—the north end of the needle resting at 24° distant from the north and south line. The reading of this is not N 24° W, as would at first be supposed from the contiguity of the letters denoting north-west,—but N 24° E. The reason of this is

Fig. 2.



apparent, on considering that the needle is the only representative of the magnetic bearing; if therefore a corresponding line, C D (Fig. 2), is drawn on paper, the end C will represent the magnetic north. The line N S coincides with a line in the direction of some object—say a fence, which on the plan will be represented by a line, E F, parallel to N S; and this line of direction, E F, is clearly seen to be on the east side of the magnetic meridian, and forming with it an angle of 24°. It is unnecessary to advert to this in any further detail; but it exemplifies what in the language of surveyors is called, "reading" the dial,—an aptitude in which requires some little practice. In Fig. 3, is a representation of the

Fig. 3.—Vernier Scales.



vernier scales, to be "read" in like manner; and I add an illustration of the manner in which the pupil's eye is to be familiarised to the value of different scales. The equality of one mile with 80 chains, 1,760 yards, and with 5,280 feet, is easily explained by dividing equal lengths into corresponding divisions; but whatever be

the denomination of the scale, the most useful mode of drawing it on a plan, and of reading it, is to show only one series of the smaller divisions (usually ten) on the left of zero, and commencing with a larger series on the right hand, Fig. 4. The convenience of this for measuring is obvious on inspection, but it is by no means universally

Fig. 4.



adopted. The graduations on different levelling staves require a little attention before they can be read with facility; and in all schools where any instruction is intended to be given in surveying and levelling, I recommend that diagrams illustrating the above and similar details be provided as alphabets of the art.

Nor is the writing practised in surveying and levelling less peculiar; the best form of field-books being so arranged as that the writing in them commences at the end of the book and bottom of each page. Independently of this, it is requisite that the surveyor write both quickly and clearly,—*quickly*, because his assistants are detained if much time is taken up in recording observations; and *clearly*, because the mistake or doubt of a single figure may cause great inconvenience and delay. Many persons are apt to get into a careless method of making their minutes, because they can understand their own writing; but in extensive surveys it may and does often become necessary that the books are to be transferred, and plottings laid down by one party from the field-books of another. In school practice I recommend that this be constantly done; that the form, arrangement, and details of keeping the field-books, being based on a proper system, the work of each pupil may be tested by an interchange of books. Moreover, it is desirable in most cases to preserve the field-books as a record, and hence the greater occasion for their being as clear and explanatory as possible; and though the surveys made by schoolboys are not likely to be of any permanent value, it is well that the habit of care and uniformity should be carefully matured. Above all things, then, the pupil should avoid arbitrary and unmeaning marks, made with the view of trusting to memory. First let him learn to write correctly the descriptions and dimensions required for the survey, and afterwards acquire rapidity of execution. Moreover, in writing any schedule of the property surveyed, or any description or report, such as a student in surveying should be occasionally exercised in, great care should be taken to have clear and distinct ideas concisely expressed and written in a plain handwriting. Nor is ordinary writing alone required; it is requisite that the young surveyor devote great care to the penmanship of neat lettering, aiming first at well-formed letters, and afterwards at some moderate degree of ornament—which, indeed, is best attained by care in the execution of such lettering as is necessary. Much of the ornament which appears in old surveying books is now wholly dispensed with, and hence the greater need for a simple and unpretending elegance, which forms the highest species of ornament in the eye of correct taste. There is also another description of writing, or rather drawing, used in the surveying field-book—namely, the representation of gates, fences, brooks, rocks, &c., all which may be

practised in school prior to any lessons in the field. In order to induce the habit of representing objects, it would be well to exercise the pupils by requiring them to delineate some simple forms—such as the doors, windows, or desks of the school, and afterwards trees, rocks, fences, &c.

Every book of arithmetic commonly used in schools contains ample information on the departments of computation required. To add and subtract with facility is essential, and great accuracy is essential to the field operations of levelling; and in this, as well as in surveying, I have always preferred using decimal arithmetic—namely, by graduating the levelling-staff into feet and hundredths, instead of feet, inches, and tenths. It is by no means improbable that, ere the scholars of the present day arrive at manhood, the decimal system may be more generally adopted; and hence, it is well to lose no opportunity of exhibiting and explaining its great advantages over the ordinary methods of computation. How much more convenient is the operation of adding and subtracting feet and decimals, than the intermixture of twelfths and tenths of feet, inches and tenths. Again: in reducing chain dimensions to acres, roods, and perches, the great saving of time is abundantly obvious, and may very properly be explained to scholars generally as an illustration of the superior advantages of a decimal system. Thus, for instance, let any given length and breadth be expressed in so many thousand links, or hundredths of a chain, and either the same numbers or the equivalent lengths be expressed in feet, and reduced to the customary area of acres, roods, and perches. The vast saving of time and labour would thus become apparent, and a portion of the public would be thus led to contemplate with satisfaction a more extended use of so facile a mode of computation.

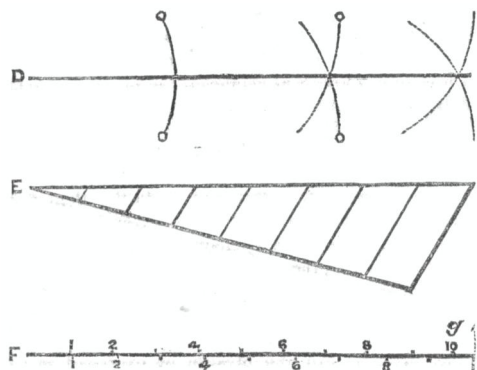
I have briefly indicated a few of the lessons in the reading, writing, and arithmetic of surveying; and I may here bestow a passing notice on the professions which appear in the public prints on the part of surveyors, who undertake in a few short lessons to impart a thorough knowledge of the art of surveying and levelling. The little learning thus to be acquired, if not a dangerous, is at all events a useless thing; and I have had many opportunities of observing how small a share of study had been bestowed upon the subject by persons professing to be competent to survey. Let me then earnestly impress on the attention of all who enter upon such tuition in schools, that it is far more important that a youth should be well grounded in the preliminary studies, rather than have a vague and indefinite notion of field measuring by following instructions of which he does not comprehend the principles, and which he would therefore be unable to apply to other cases.

It can scarcely be necessary to add, that among the indoor and preliminary studies of the young surveyor, an acquaintance with the first elements of geometry and mensuration is indispensable; but this is so evidently implied in the very nature of the occupation, that I shall only in this paper allude to such matters connected therewith as admit of some practical illustration not usually found in books. The geometrical principles of surveying and levelling are indeed placed within the reach of every teacher and of every student; so much so that I consider it chiefly of importance to point out such considerations as are less prominent, but which have an immediate and practical bearing upon the study of the art as capable of being applied in the ordinary routine of teaching.

In theory, and in the usual mode of treating the sub-

ect of geometrical drawing, a straight line is assumed as being readily attainable, whereas strictly speaking it is in practice very rarely accomplished, except on a very small scale. A circular arc is much more readily drawn with accuracy than a straight line; few rulers are perfectly straight, as may be observed by drawing a line and then reversing the ruler, when it will be found that almost every ruler is either convex, concave, or irregular. Another mode of testing the accuracy of a straight line, or even of drawing a very long line by means of only a short ruler, is shown in Fig. 5, D, by

Fig. 5.



which process it is obvious that a line of indefinite length may be made as perfectly straight as the imperfection of all such operations by hand will admit. Few things appear more simple as a geometrical exercise than to construct a square of 18 or 20 inches on drawing paper; yet such is the amount of inevitable imperfection in the manipulation that it is a work of extreme difficulty, and the attempt to accomplish it may sometimes prove a salutary lesson as to the difference between the creation of an idea in the mind, and the following it out in practice. Nay, even the very contraction or expansion of the paper during the process of drawing will suffice to disturb the accuracy at which in theory we aim; and it is well that the mind of every student be impressed with these difficulties, if it were only to show the greater necessity for care in endeavouring to accomplish all that is practically attainable.

Next to the delineation of straight lines, the division of them is an operation frequently required; and here again the circle admits of easier and more correct division than a straight line of any given length, inasmuch as the radius is at once the measure of one-sixth of the circumference. A ready mode of dividing a straight line into any number of equal or unequal parts is to set them off by any scale which approximates to the given length, and transfer the several divisions to the said line by drawing lines parallel with the two extreme points, (as shown in Fig. 5, E.) In practice, I have found that if a line, (Fig. 5, F) is required to be divided into say ten parts, the eye can readily make a near approximation, and running over the line with the compasses at a guess, the distance  $g h$ , remains; the compass-point is extended over one-tenth of this space, and one, or at most two trials are usually sufficient to arrive at accuracy. This, though by no means the most geometrical mode, is nevertheless one which I have always found convenient in practice; it depends of course upon the accuracy with which the eye can estimate distance; but this is precisely the reason which induces me to name it, inasmuch as it is the more adapted for that continued practice which is easily attainable at school,

and by which a facility of measurement is gradually increased.

The measurement of crooked lines is frequently required in surveying and in estimating distances on plans, and is in most cases best performed by adding each additional length to the span of the compasses placed in the direction of such additional line. Simple as this method may appear in practice (and it is much more readily exhibited than described in writing), it was found on one occasion to have the attraction of novelty to one of the most eminent mathematicians of the present age; a circumstance which forms an ample apology for my introducing, even in the presence of the best informed teachers, details which at first sight may appear insignificant or superfluous. Indeed, I am satisfied that there is no greater barrier to progress than the neglect of the numerous little details which, after all, form a considerable part of the operations of surveying, or of any other art. They form, in fact, the small coin which is daily and hourly needed. Greater operations involving more extended principles come less frequently into play. I have given a few examples of studies which may be followed in the school previously to field practice, and the experience of the teacher will suggest similar exercises derived from books or from observation of field practice. I have also kept in view such diagrams and modes of illustration as are within the scope of an ordinary village school, as no difficulty can exist in larger and more opulent Institutions; and it will be my endeavour to adhere to this consideration throughout the observations now submitted to your Society.

I will therefore suppose a teacher with a class, say of six students, about to enter upon the field operations of surveying. They are about to begin a survey. What instruments and apparatus are now requisite? These I will endeavour to describe.

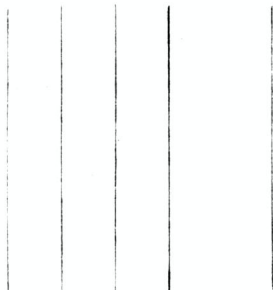
1st. The chain, which is so well known as to need no description in this place. It coincides in length with one side of a square, whose area is one-tenth of an acre; consequently 10 chains in length by 1 chain in breadth form an acre. Its length is 22 yards, or 66 feet; and its divisions, being 100 in number, are 7.92 inches each in length. Hence the facility of computation already alluded to, inasmuch as exactly 100,000 square links are contained in an acre; therefore when links are multiplied into links, it is only necessary to point off 5 places of decimals to reduce the product to acres. It is requisite to keep in view that any error in the length of the chain must occasion erroneous measurement throughout the entire survey; it is therefore proper to have it tested from time to time, which is best done by having marks cut on a flagged, level pathway, which, if near the school, may also be used for the scholars to accustom themselves to what is called "pacing," that is, measuring by footsteps 20 paces to the chain, each pace being 5 links, or by 22 paces of a yard each. The chain pins are best marked by strong red tape, and the offset-staff, 10 links long, should have the 10 divisions marked by painted lines—not by nails drawn in, or by incisions, either of which weaken the staff so much as to be a frequent cause of breakage.

2nd. The Field-book. The form in which the measurements taken in the field are recorded is an important feature in surveying operations, and various methods are recommended by different writers. That which I have now to recommend to your attention has never, that I am aware of, been published; but it possesses advantages which are apparent on inspection. In Nesbitt's "Surveying," and numerous other works of a similar



character, the middle column, which contains the chain-lengths of the main line, is considered as representing the course of the chain, and the objects—as fences, houses, rivulets, &c.—are drawn on each side; and if any of these objects cross the line, then the lines representing such objects are continued across the column. In the form represented in Fig. 6, the course of the

Fig. 6.



chain is represented by a single line which enables the surveyor to delineate the several objects much more correctly. I can say from long experience, and not narrow opportunities of observing a great variety of forms, that I have never met with any form better calculated for making an easy record in the field, and presenting at any future time an easy index to the objects represented on each side of, or crossing the single line. The manner of using the several columns will be explained when describing the operations in the field.

Small wooden pegs are useful, and tickets of strong paper or card-board, to mark the number and position of principal stations. It is also desirable to have at least half a dozen small flags; to these must be added a tape-line, pencils, penknife, and India-rubber, which complete the apparatus required for chain-surveying. I may here observe, that estate surveys of great extent are capable of being executed wholly by chain-measuring, without the aid of the theodolite or dial; but wherever the practice of surveying is taught in schools to any considerable extent, it is desirable that either a circumferentor or theodolite should be occasionally used. With the exception of this costly addition, the outlay necessary to furnish a class of six pupils with proper materials to survey an estate need not exceed from 25s. to 30s. A tolerable proficiency in the use of the chain alone and its simple accompaniments, would probably in most country places enable an active teacher, with a few industrious lads, to make some survey of lands of sufficient value to gain such remuneration as would provide the class with a circumferentor, or even with a theodolite.

(To be continued.)

### THE PROPOSED NATIONAL INSTITUTIONS AT KENSINGTON.

THE following paper has been submitted to His Royal Highness Prince Albert, as President of the Royal Commissioners for the Exhibition of 1851, by Mr. Henry Cole, C.B. It will be seen that Mr. Cole contends that the comprehensive proposals made in the Second Report of the Royal Commissioners for aiding the establishment of Institutions to promote Science and Art at Kensington, would be most effectively carried

out by the public themselves, rather than by Government. Mr. Cole proposes to abstain from discussing the subject in its further details, or of pointing out the means of engaging private enterprise in their accomplishment, until the principle of executing the Commissioners' plans, not through Government, but by the public themselves, shall be admitted:

1. If the plans for promoting Science and the Arts, proposed by the Commissioners of the Exhibition of 1851, including the formation of an Historical Gallery of Painting and Sculpture, are to be carried out in the spirit of the event which originated them, and to be commensurate with the present intelligence and wealth of the country, not only a very liberal expenditure will be necessary, but large discretionary powers of action, to be exercised uncontrolled for a time, must be confided to a body to be especially devoted to the object. In order to insure the highest responsibility and unity of action in the management, it is advisable that it should consist, if possible, of only one person, or at most three persons. But it may be reasonably doubted if the public at large, the House of Commons as its representative, the Executive Government, and the several administrative departments, which it is proposed should be connected with the plans, will agree to confer the extensive powers requisite for success, or will trust any one person or small Commission with what may be considered an unlimited control over the very large expenditure of public funds which ought to be guaranteed at the beginning of the work, and would be so guaranteed if the plans were carried out by private enterprise.

2. There are palpable reasons, having a broad application, in the present times, why the action of any executive body appointed by Government for the application and expenditure of public money is usually much less prudent and less bold than any Corporation expending the capital which belongs to itself. Money that is paid from the public treasury is the property, as it were, of the *people generally*; and each individual, at all interested in the work to be undertaken, considers that, as a contributor to the funds to be spent, he *has a right* to give his opinion on the mode in which they ought to be employed. The managing body, therefore, is overwhelmed with suggestions as to the manner in which the duties which have been committed to them are to be performed. They become vacillating in the exercise of their functions under so extended a supervision and criticism; the suggestions and opinions promulgated are advocated by different parties, and, after probably much debate and mutual recrimination, one party obtains a majority, and proceeds to act upon this victory. But the conquering party has become timid, and fearful of increasing the rancour of the opposition by acting firmly and decisively in the direction they had advocated; whilst the defeated section are induced, if only in justification of their own opposition, to detect constant faults in the execution of the plan against which they have contended: they vilify and degrade as much as possible their victorious opponents, and the large mass of those who rarely think for themselves, and are not qualified to form any opinion of their own, either become altogether indifferent on the subject or join with the malcontents, and do all in their power to thwart the action of what they have been taught to believe to be an incompetent and ill-judging body. On the contrary, with a Corporation spending their own money, the public feel that they have no right to interfere. The capital belongs to them; they will profit by success; they are

in peril by failure; and the same personal interest and responsibility which give spirit and energy to the management prevent the interference of others, who feel that, as they have no stake, so they can have no plea for interfering with the progress of the undertaking.

3. That energy of action which could be exerted by a body having at their disposal an immense capital, already subscribed for and available at any time by successive calls, becomes impossible under any commission which is constrained to make timid advances, having to apply to Parliament for one vote after another, always desirous of bringing their estimates within the smallest possible compass, and always liable, by a different attendance on a particular day in the House of Commons, to have their whole proceedings stopped by an adverse vote.

4. From the circumstances already described; as well as from divided, and therefore imperfect, responsibility; from exemption from penalties in case of failure in the managing body itself; from want of power, want of confidence, and other circumstances inherent in the working of the English Constitution; the conviction has gradually become very general, that Government administration is greatly inferior to that conducted by private enterprise. The Marquis of Lansdowne, among other statesmen, has expressed forcibly this view. In 1847 he said, "It is universally admitted that Government are the worst of cultivators, the worst of manufacturers, and the worst of traders." All evidence, also, proves that Governments do not succeed as builders or managers of Institutions, administrative or educational. It may be said, without contradiction, that hardly a single important structure has been erected by Government within the last fifty years, which, after a very short experience of it, has not been proved to be defective.

5. The administration of our Government Institutions, especially those under *boards*, is constantly suspected and undergoing inquiry. The Customs, the Stamps and Taxes, the Excise, the Admiralty, the Exchequer, Ecclesiastical Commission, the Public Records, the National Gallery (three inquiries in as many years), the British Museum (twice in a few years), the Schools of Design, have all been examined into lately by Committees or Commissions, and several by both.

6. The transitional state of our Governments, and their relations to the House of Commons, also appear to be one of the causes of the failure of Government undertakings compared with those of private agencies. But it should be borne in mind, that it has always been characteristic of the people of this country to carry into effect their own desires themselves, rather than to be indebted to any central Government. Even when monarchy was strongest it was so. Our cathedrals and ancient churches, our universities and public schools, cannot be said to have originated in any central Government. So, in modern times, as different wants have arisen, our roads and bridges, docks, canals, streets, systems of lighting, railways, ocean navigation, &c., have not been produced by Government, but by the people for themselves. The administration of popular Institutions is not free from defects, but they are much fewer and less serious than in Government Institutions; and, when faulty, the remedy is more instantaneous, and readily submitted to. Government administration is slow and timid, whilst popular administration is rapid and prompt and bold. No Government would have ventured to start express trains at sixty miles an hour, as Lord Granville has well re-

marked. Government shrinks from giving the public information, and even its good intentions are often frustrated for want of it. The metropolis lost a beautiful flower-garden at the west end of St. James's Park, because no candid explanation of the plan was afforded. Government declines taking the initiative, always following rather than leading public opinion. Successive Governments declined to undertake a National Exhibition of Industry, and would probably do so again; and at no time did the Government give much countenance or help to the Exhibition of 1851. When private Institutions for promoting Science and Art come into comparison with Government Institutions, the latter always suffer by it. In illustration, the Zoological Gardens may be contrasted with the late Royal Menagerie in the Tower. The want of unity of action is signally shown in the New Houses of Parliament.

7. The preceding instances are sufficient to contrast the value of self-supporting Institutions with those of the undertakings of Government, which are supported by grants from public funds. The very appellation of "self-supporting" asserts the necessity of energy and exertion for the security of existence; and the decline of public patronage, which immediately follows faults of management, enforces a watchfulness and a readiness to correct errors, which a Government Board would avoid as a confession of previous faulty administration.

8. It is also characteristic of the people of this country, that they do not so much value anything to be obtained gratuitously as that of which they have to mark their approval by being ready to pay for it.

9. Another growing feeling which opposes any undertaking of a very grand and comprehensive character being satisfactorily carried out under Government management, and by the expenditure of public money, is the increasing dislike of the large provincial towns to the monopoly in London of great institutions to be paid for by money collected by the general taxation of the country. The feeling is growing rapidly, that such great works should be executed where they are called for, and be paid for by those who desire to use them.

10. Looking, therefore, to the assumed right of everybody to interfere, and the exercise of such right; to the insufficient knowledge of the principal controlling body in Government works, the House of Commons, especially on subjects of Science and Art, and its consequent diversity of opinion; to its imperfect sense of the means of insuring responsibility; to its want of confidence in the Executive Government, and its frequent usurpations of Government functions; to its capricious fits of parsimony and extravagance: looking, also, to the submission of the Executive Government to the House of Commons, and its consequent weakness; considering how inadequately the Government is organised for undertaking new works, or even performing its current ordinary business; and, finally, seeing the want of co-operation between Government departments and their mutual jealousies, it seems hopeless to expect from the agency of Government a large and comprehensive execution of the Commissioners' plans—an execution worthy of being handed down to posterity as truly representing the feelings and energy of the people of this age.

11. It will be admitted that these plans ought to be realised with the same success as attended the Exhibition of 1851, and should not be less effective than the great works of the Crystal Palace, at Sydenham; but then the means of action must be as free and large as those which have produced the Exhibition and Crystal Palace.

12. The foregoing premises being conceded, it follows,

that the execution of the Commissioners' plans would have the best chances of success, if carried out by private, and not Government, agency.

13. The plans involve the erection of spacious and attractive buildings (themselves developing the highest state of science and art), for the purpose of exhibiting collections, which should illustrate the progress of science and art; the formation of the collections themselves, and the execution of various extensive works, conducive to popular improvement and recreation. Besides, it is proposed to erect certain buildings for Government objects, such as the Department of Science and Art, and for any Institutions which may require them, such as the Royal Academy of Music, which has already applied for ground at Kensington for a building.

14. The Government and the Commissioners would have to lay down certain general conditions, defining whether the whole, or only a part of the plans, should be executed by private agency.

15. The following course of action might probably be arranged, and would seem calculated, on the one hand, to secure the advantages of responsible and unfettered action, and enlist the strongest motives to produce the highest excellence; whilst, on the other, it would enable the Government to adopt the result as a national work without incurring the risk of a failure. A charter should be granted to a public company, conferring the privileges of carrying out the erection of the buildings, and the decoration of them; the laying out the grounds with terraces, fountains, and sculpture, and the formation of certain collections, including all that ought to be comprehended in a National Gallery of Painting, Sculpture, and other decorative Arts. As respects the few paintings already national property, the Government might lend them, and agree to pay a fair rental for the space occupied by them. The company should be the sole judges of the scale of its expenditure and the execution of the works. When the structures and collections were sufficiently complete to be opened to the public, the Government, in return for its assistance, should have the right to determine whether the public should be admitted gratuitously or by payment. If it were determined gratuitously, then the whole works would be purchased for the nation at a fair valuation, upon principles previously settled. If the Government declined the purchase, then the public should be admitted on payment, so successfully tried at the Exhibition of 1851, and the company would undertake the future management, Government still reserving the right of purchase at the expiration of certain periods of time. The company might also contract to provide buildings for private Institutions. Space in the buildings might also be provided to exhibit the existing Government collections of sculpture, &c. under certain conditions; but these at present form a small part of what systematic collections of Art and Science would become by the energies of private enterprise, which would create galleries as extensive as those of the Louvre, as systematic as those at Berlin, and as rich in illustrations of the decorative arts as the Historical Collections in the Zwinger and Green Vaults at Dresden.

16. It does not appear necessary to prosecute the subject into further detail until the principle of proceeding by Government or private agency is determined. If private agency be employed, then it may be predicted that the Commissioners' plans would be realised with an expedition, economy, popular interest, and confidence, completeness and final success, far greater than could be hoped for under any Government administration in this country at the present time.

## HOME CORRESPONDENCE.

### CHEMISTRY AND PERFUMERY.

SIR,—The discussion about chemistry and perfumery in reality amounts to this: Mr. Septimus Piesse confines the term "perfumery" to such things as eau de Cologne, &c. Perfumed soaps, groceries, &c., he does not appear to class as "perfumery." Now, the artificial scents are, as yet, chiefly used for the latter substances; which in common language, and, I should say, in the perfumer's nomenclature also, would be included in "perfumery."

The authority for cow's urine being used for perfumery, is to be found in a little French work, called, I believe, "La Chimie de l'Odorat," in which a full description is given of the collection of fresh urine, and its application to this purpose. I need scarcely say, that it is the benzoic acid of the urine which is the odorous principle. Your obedient servant,

A PERFUMER.

### THE PAPER DUTY.

SIR,—If the consumption of paper may be taken as a criterion of the state of civilisation of a nation, and any further argument be necessary to induce the Chancellor of the Exchequer to repeal the paper duty at the earliest possible period, thereby helping forward the great work of education, the following extract from the *New York Tribune*, of Oct. 13th, may not be undeserving of serious consideration:

"Our improved methods of making paper have, however, been closely pressed upon by the immense and increasing consumption of the article. And nowhere is so much of it used as in the United States. In France, for example, with its 35,000,000 of inhabitants, only 70,000 tons of paper are produced yearly (of which one-seventh part is for exportation), giving only 4 lbs. per head; and in England, for its 28,000,000, the production is 66,000 tons, giving 4½ lbs. per head; while in this country (America), the production may be calculated, although there are no precise documents, at very nearly the same amount as in England and France together, no part of it being exported, yielding for the 20,000,000 of free Americans very nearly 13½ lbs. per head as the yearly consumption. This can be accounted for only by our liberal institutions, the circulation of the journals, and the vast use of books in the common schools."

I am, Sir, yours very truly,

WAIMA.

### JUICE OF THE MUDDAR.

SIR,—In the Number of your Journal for August mention is made of an important communication from Dr. Riddell, of the Nizam's service, on the elastic gum obtained from the sap of the muddar, which he conceives might be employed as a substitute for gutta percha. Having published a notice on the subject in the *Bombay Times* eight or nine months since, on receiving specimens of the gum from Dr. Riddell, Sir Richmond Shakespeare, resident at Gwalior, set on foot some experiments of a more minute description than Dr. Riddell, with the view of ascertaining its electrical properties, when it turned out not to be a non-conductor at all; it conducted electricity as freely as a piece of untanned hide, and was therefore altogether unfitted for a coating to telegraph wires. We are not the less indebted to Dr. Riddell for his inquiries, and the muddar sap may serve some of the other uses of gutta percha where its electric properties are of no conse-



quence. Many of its qualities are perfectly well known to the natives. In 1847 Major Ludlow sent me down some men from Rajputana, to study European arts and manufactures at the School of Industry, then coming into existence under my charge, and amongst other things the use of the English turning lathe. The rats having eaten all our cat-guts, we were driven to the use of whip-cord for our lathes; and this again was continually annoying us by stretching and not recovering itself. One of my pupils remedied the difficulty by soaking the whip-chord in the milk of the muddar, thus converting it into an elastic string which no animal would meddle with; and he told me that in his own country it was employed for making leather and cloth waterproof, or bow-strings elastic. Subjoined is a list of the papers I have observed on the subject, taken from the second edition of my Index, now preparing for the press:

MUDDAR (*Calotropis gigantea* or the *Ak. C. Hamiltonii*)—On the manufacture of cloth and paper from the downy substance contained in the follicles of *Echmonkton*, *Journal of the Agricultural Society of India* in 1849, page 51.—On the Medical Properties of, Dr. Wallich on, *Madras Literary Transactions*, 1835, p. 278.—On the Juice of, as a substitute for Gutta Serena, Dr. Riddell on, *Transactions of the Agricultural Society of India*, 1853, and *Transactions of the Lahore Agricultural Society*, 1852.—Dr. Wight's Observations on, *Madras Literary Journal*, 1835.—Playfair on, *Calcutta Medical and Physical Directions*, Vol. I.—Dr. Camin on, *Edinburgh Medical Physical Journal*, October 1827.—Dr. Duncan on, *ibidem*, 1829.

I am, your obedient Servant,

GEORGE BUIST.

#### PATENT LAW.

SIR,—I am anxious to call attention to the considerations which, in my opinion, after many years' practice, and having been in the thick of the late movement for patent reform, ought to form the ground for an equitable and reasonable patent law.

It will doubtless be admitted that nothing but inventions actually new (at all events, within this realm) and useful, should be allowed to be patented; and that such useful novelties being patented, the patent right should be kept as inviolate as may be.

To ensure that nothing but inventions actually new be patented is not altogether impracticable; to ensure that no patent shall be conceded for useless matters does appear to me to be impracticable. But to ensure inviolability to a great degree does appear tolerably easy.

The Patent Law Amendment Act did originally propose to secure that patents should be granted for novelties only, by requiring all applications for patents to undergo an examination by competent parties (not the law officers). This, however, was much objected to on the score of the difficulty it was feared would be found in obtaining competent parties, namely, persons of sufficient technical knowledge and yet having liberal ideas enough to deal fairly by inventors—views which the working of the American and Prussian examination systems render very plausible; its expensiveness, if properly done, was also a most pertinent objection. To help to ensure the inviolability of the patent the Act did make some provisions, such as facilitating the procuring of injunctions, &c., and requiring alleged infringers to state in detail their objections to the patent before the trial of any patent law suit.

Now, I propose, that after the application for a patent

has been allowed, the applicant or his agent shall be permitted free access to the books and patent records without charge (the fee paid on application for a patent to be deemed sufficient), and if any museum or library be formed, which is desirable, free access thereto also.

That in giving notice to proceed he or his agent shall declare that after searching, he still believes himself to be the true and first inventor.

That instead of public opposition being repressed by reason of the entry of opposition or objections entailing, as it does, an expense of 2*l.* (exclusive of 3*l.* 10*s.*), payable for the hearing, the cost of such entry to be 5*s.* at the utmost, and that the Commissioners' Officer shall peruse the notice of objections; and if it show that the invention is already public or patented property he may officially oppose, but not to the exclusion of the objector if he likes to bear the expense; and if the objector leaves the matter in the hands of the office, the 5*s.* may, at the discretion of the Commissioners, be returned.

That if the law officer decide against the patent being granted, the applicant may, nevertheless, appeal to the Lord Chancellor. At present the objector, if not satisfied, may so appeal, but not the unfortunate applicant.

That the patent being once sealed, shall be *prima facie* evidence of patent right; that is, the whole onus of proving it bad shall rest on those who impeach its validity.

That no *scire facias*, or action to repeal letters patent, be commenced but by the Attorney or Solicitor-General, *ex officio*, and then not till after an inquiry made by proper examiners (to be attached to the Patent Office), at the expense of the Government. My reason for this is, that the Government having received payment for granting, or, so to speak, allotting a property to the inventor, and having professedly granted it, is bound to support it, or to satisfy the world that it has been obtained improperly of them, in which case they are bound forthwith to repudiate it. I do not, however, intend that the Attorney-General shall be bound to do more than advise with the examiners, leaving him to prosecute or not, at his own discretion. What I desire is, that the Government shall be left to deal with the annulling of the patent, as they may judge right for the public interests and justice, the public having, as now, the right to defend itself against any undue assumption of patent right, by pleading that it is an assumed and not a valid right.

I noted the remarks in a recent number of the *JOURNAL*, with regard to which I would say that I am quite sure that until we have somebody else besides law officials on the Patent Commission, we shall have little further amendment. It was this feeling that made me, during the progress of the Bill, suggest the adding of the President and Vice-President of the Board of Trade to it, their department being quite relevant to the subject of the Patent Laws. For myself, I am not one for giving the Commissioners any very great powers or duties, as my observation of the practical operation of such bodies has not tended to give me much confidence.

I am, Sir, obediently yours,

F. W. CAMPIN.

156, Strand, 24th October 1853.

#### GRATUITOUS LECTURES.

SIR,—Your numerous readers have had placed under their notice lectures and lecturers, and several valuable suggestions respecting them. There is one other suggestion which, with your leave, I would beg to add. Of its worth the highly intelligent members of your

Society will judge. It is not intended to offer any general comparison between paid and unpaid lecturers, but to caution inexperienced office-bearers, in newly-formed Mechanics' Institutions, lest by indiscriminate acceptance of the services of gratuitous lecturers, they find themselves involved in pecuniary charges far greater than would have been incurred had professional lecturers been engaged.

"Experience is the scar of our wounds." Perhaps some may use my experience, and so escape hurt.

Some years ago, a circumstance of an unusual character induced the sudden formation of a Mechanics' Institute in my neighbourhood. Socialism in its most undisguised form, and irreligion in its entire deformity, were openly introduced. Among other things, the young were invited to infidel lectures, frequently given on Sundays, and to public dancing on Sunday nights.

To oppose such appalling mischief, all parties combined. A Mechanics' Institute was formed; lectures, moral, literary, and scientific, were given; and a respectable library was formed.

It fell to my lot to be the treasurer of the newly-formed society, and hence my experience, offered gratuitously, that others may not purchase it for themselves.

Among the gentlemen offering to lecture without charge, was one who had recently taken the degree of M.D., and whose chemical attainments were reputedly, and I believe really, of a high order. His services were accepted. The young Institute had to purchase everything necessary, and many things unnecessary. In truth it seemed as though a laboratory had to be formed; and in the end it was found that the amount paid for two or three lectures on chemistry would have procured the delivery of entire courses on several subjects by the most experienced teachers.

The positive injury was first noticed in the diminished funds at the Society's disposal for its library. In this case, as in others, the lectures served to obtain members, but it is an increasing library which retains them. In these unfortunate lectures so much had been expended, that for a time the library had few additions, and the Institute lost its healthy action. This was never fully restored. Presents were made to the Institute by its office-bearers and other of its members; but as soon as Socialism had yielded to better influences, it ceased to possess the same interest, and to retain its supporters. Finally, it was wound up just in time to prevent loss to its members.

The record of my experience may be given in one short aphorism,—"*Beware of gratuitous lecturers*;" not by any means rejecting them altogether, but being very careful that they do not occasion unnecessary expense.

Yours, &c.

MERCATOR.

## PROCEEDINGS OF INSTITUTIONS.

BASINGSTOKE.—On Thursday evening, October 27th, a lecture was delivered at the Town-hall to the members of the Mechanics' Institute by John Haas, Esq., of Queenswood College, on "Fables," comprising the following syllabus; namely:—mythological fables—the Esopian fable; its origin, element, history, and development—tales—allegorical tales—perfect fables—allegory—introduction of animals as characters—the Seven Wise Masters—Zilpag—Jostran's fable—Esop—modern fabulists—drollery and humour of fables—animal poetry—sympathy for animals—objections—sarcasm—reasonings by illustration—use of the fable—fables that have played

a part in history—political fables—fables with maxims, prudential and moral, as applied to practical life.

CRIEFF.—The Annual meeting of the members of the Mechanics' Institution was held on Thursday evening, October 27th. The chair was taken by the President of the Society, Dr. Gairdner, who called upon the Secretary to read the report of the Committee for the past year. The report stated the general satisfactory progress of the Institute, and that considerable advance had been made towards the realization of the desires of its founders. The three great features of the year were—the enlargement of the library; the formation of a museum, which had already been enriched by valuable contributions; and the union of the Institution with the Society of Arts. "This feature of the year," says the report, "is in some measure the most important of the three, not so much on account of present benefit as of future promise; for this Union of Institutions is a movement fraught with great results, and calculated to exercise a mighty influence on the literary and scientific training and education of our artizans, for whom these Institutions are mainly designed. . . . It may be asked, What benefit has this Institution received from this union? Your Committee are free to answer that the principal benefits are yet prospective. It is not to be expected in the nature of things that this infant union should accomplish in the two first years of its existence all it may be fairly expected to do. Its path is untrodden, and its duties are new; the opinions and desires of its component Institutions are various, and occasionally conflicting; and better far is it that we should labour slowly and patiently in concert, at the unseen but all-important foundation of the building, so that the majestic superstructure may rise gradually, fixed on a firm and tried basis, than that, like a glittering palace of fairy story, it should rise in a night and as quickly disappear." The report then enumerates some of the present benefits of union; namely, more than two guineas' worth of books and pamphlets received, the reciprocation of privileges, the prepared list of lecturers, the average reduction of forty per cent. upon the books of seventy publishers, the circulating collection of photographs, &c. The following office-bearers were chosen for the year 1853-54; namely,—President, Rev. W. Ramsay; Vice-President, M. B. Gairdner, M.D.; Treasurer, Mr. J. McIntosh; Secretary, W. D. Fairless, M.D.; Curator of the Museum, Mr. J. Laurie; and the following gentlemen, in the room of the five retiring Committeemen, namely, Mr. Monteith (of Broich), Mr. John Knox, Mr. William Thompson, Mr. D. Dinne, and Mr. J. McLeish. It was announced that the Inaugural Address of the session would be delivered by the new President on the 10th of November.

DEPTFORD.—A lecture was delivered here on the 26th of October, to the members of the Institution, by Mr. Topham, on "Wordsworth." The singular self-reliance of the poet, his superiority to contemporary criticism, the feeling that possessed him that he was "dedicated" to a special work, the utility of his writings, and the lesson taught by his biography, were dwelt upon in a pleasing and impressive manner. Several characteristic and illustrative quotations were given, which, in a marked degree, associated Wordsworth with gentleness and spirituality.

HASTINGS.—The annual soirée of the Mechanics' Institution was held in the George-street Assembly-room, on Wednesday sennight. The chair was ably filled by G. Scrivens, Esq., President of the Institution, supported by the Rev. J. H. Fisk, the Rev. J. Stent, Mr. W. R. Selway, Mr. Galindo, Mr. G. P. Bacon, Mr.

Banks, Mr. J. Rock, jun., Mr. Putland, and Mr. Gutsell, The Secretary (Mr. Banks) read a report, which stated that the library now contained 1,439 volumes, and that during the last year 50 members, including 15 ladies, had been added to the list; making the total number 225. There were no classes at present in operation, but the Committee were very anxious to commence some, and would do so forthwith. After some remarks by the President and others, Mr. Banks exhibited some experiments in voltaic electricity, and the meeting separated.

LYNN.—At a meeting of the members of the Convezazione and Society of Arts held on Friday, the 24th of October, Mr. H. Solly, of London, gave a lecture entitled "A Voice from the Middle Ages"—a glance at the enthusiasm of bygone days, which was listened to with great attention, and presented a gratifying feature and result of the Union with the Society of Arts.

PRESTON.—The Twenty-fifth Annual Meeting of the Institution for the Diffusion of Knowledge was held on Tuesday, the 4th day of October; Mr. T. Walmsley, President, in the chair. Mr. John Burton, one of the Honorary Secretaries, having been called upon to read the report, stated that the number of members of all kinds amounted to 537. During the past year 150 volumes had been added to the library, by purchase, and 29 volumes by donation; of which 20 had been received from the Society of Arts. Besides these donations to the library, 67 silver coins had been presented to the Museum, all in fine preservation, and differing in date, device, legend, or mint mark. They were a portion of a treasure found on removing the storm-stricken thatch of a cottage at Tenter-hill, Whittingham, in the early part of the present year; having probably been secreted there when Cromwell met and vanquished 'the Scotch army of Charles, "near Preston, in Lancashire," in August, 1648. Two prizes, of five and two guineas, respectively, were then awarded to Mr. J. H. Forshaw and Mr. T. Livesey for their Essays on the Mode of conducting the Classes in connection with the Institution.

REIGATE.—The Mechanics' Institution has just held its sixteenth anniversary. The Committee, in transferring their trust, recommend to their successors in office the immediate establishment of classes, to repair the deficiencies of early education, and promote the further extension of knowledge. The library contains from 1,100 to 1,200 volumes, and consists of the best works on modern science and literature.

ROMFORD.—The annual soirée of the Literary and Mechanics' Institution was held, on Monday week, at the Corn Exchange. The reading-rooms were filled with articles illustrative of the progress of science and art, and the walls were enriched with some good paintings. In the course of the evening, the Rev. Mr. Jones, the President, to whose zeal in the cause much of the success of the Institution and of the evening was owing, directed attention to the collection, pointing out some of the chief objects of interest; and the members of the Chelmsford Musical Class and the Romford Choir, diversified the entertainment. On Tuesday evening the rooms were again opened, when Mr. Edney delivered some of Lover's Irish songs; and the Rev. Mr. Jones urged the formation of a Museum, similar to that at Saffron Walden.

SHREWSBURY.—On Monday, Oct. 24th, the twenty-eighth annual general meeting of the members of the Shropshire Mechanics' Institution was held in their large room, over the Market Hall, to receive a report of the proceedings of the past year; Thomas Pidduck, Esq., President, in the chair. The report was read, and adopted. Mr. William Phillips was elected president

for the ensuing year. Messrs. Parry, Pidduck, Scoltock, Stuttle, Mallard, and Phillips were elected committeemen, to fill up the places of those who retire. Messrs. William Brightwell and J. E. Smith were appointed auditors. Mr. Edward H. Hudson was elected honorary secretary in the place of Mr. William P. Scoltock, who resigned. Votes of thanks were unanimously accorded to the retiring officers, and especial reference was made to the services rendered to the Society by Mr. William P. Scoltock during the ten years he had occupied the office of secretary to the Institution.

UXBRIDGE.—The eighth annual meeting of the Literary and Mutual Improvement Society was held in the Public Rooms on Tuesday, the 18th ult., Harry Chester, Esq., of Highgate, in the chair. Mr. Hutson, the late Secretary, read the report, which stated that the present position of the Society was most encouraging, and that the removal to the Public Rooms had caused an increase of about thirty members. Numerous Lectures had been delivered during the season, and about 100 volumes had been added to the Library during the year by donation and purchase. The Society was not in debt. The Chairman then gave an address of an exceedingly interesting and valuable character, containing many practical suggestions on the subject of classes, of lectures, and of the conduct of such Institutions generally, eulogising the Committee for the general management of this Institution. He also suggested the possibility of extending the benefits of such Institutions, by bringing before the people subjects connected with government, public health, &c., &c. The Rev. C. P. Price then, in a short speech, expressed his good wishes for the prosperity of the Society, and spoke generally of the usefulness of such Institutions. The Rev. J. Glendening made some remarks on the mental and social benefits to be derived from the culture of the human mind. Mr. Jos. Hunthen addressed the meeting more especially with reference to the claims of the Institution on the town and neighbourhood, urging all to help to render it more efficient and to extend its influence.

WELSHPOOL.—On Monday evening, 17th Oct., Mr. W. Hughes, F.R.G.S., delivered a lecture to the members and friends of the Reading Society, on "Australia; the El Dorado of the Nineteenth Century," which gave great satisfaction, and was listened to with marked attention throughout. The chair was taken by the Venerable Archdeacon Clive, President of the Society.

WINDSOR.—On Wednesday, the 5th ult., the Rev. Edward Hale, B.A., of Eton College, delivered the introductory Lecture to the members of the Windsor and Eton Literary, Scientific, and Mechanics' Institution on "The Rise of German Literature." The lecturer gave a very graphic sketch of the rise of the national literature in the reign of Charlemagne, tracing its progress as far as the seventeenth century, and illustrating his subject by appropriate quotations from various German bards, minnesingers, philosophers, and divines; at the same time rendering it amusing by a happy admixture of anecdote. On Wednesday evening, the 12th ult., the second lecture of the session, on "The Sense of Hearing," was delivered by Mr. W. Rayner, of Uxbridge. The diagrams were excellent, and the lecturer's style was forcible.

### TO CORRESPONDENTS.

To Members.—The Secretary particularly requests that he may be informed of any irregularities in the delivery of the JOURNAL, which should be delivered free of charge, and not later than Saturday. In order to avoid mistakes, Members will have the goodness to inform the Secretary from time to time of any change of address.

## MEETINGS FOR THE ENSUING WEEK.

- Mon. Entomological, 8.  
 TUES. Syro-Egyptian, 7½.—1. Mr. T. Wright, "On the Mediæval Notices of the Cave of Machpelah." 2. Mr. S. Sharpe, "On the Comparative Ages of the Pyramids."  
 Civil Engineers, 8.  
 Zoological, 9.  
 Medical and Chirurgical, 8½.  
 WED. Pharmaceutical, 8½.  
 Arch. Assoc., 8½.  
 Ethnological, 8½.  
 FRI. Astronomical, 8.  
 Philological, 8.  
 Arch. Assoc., 8.—Class of Design.  
 SAT. Royal Botanic, 3½.  
 Medical, 8.

## PATENT LAW AMENDMENT ACT, 1852.

## APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette, 23th October, 1853.*

*Dated 16th June, 1853.*

1464. J. A. A. Dumoulin, Paris, and 16, Castle-street, Holborn—Instrument for measuring and tracing.

*Dated 1st August.*

1794. S. C. Lister, Manningham, Yorkshire—Machinery for washing wool and hair.

*Dated 20th August.*

1949. A. Cuninghame, Glasgow—Manufacture of alkalis.

*Dated 50th August.*

2026. C. Goodyear, Avenue-road, St. John's-wood—Waterproof fabrics.

*Dated 6th September.*

2054. A. Sommerville and C. Twigg, Birmingham—Penholders, improvement applicable to umbrellas, &c.

*Dated 1st October.*

2242. C. Coates, Sunnyside, Rawtenstall, Lancashire—Coupling-pipes, &c.

2244. E. Davies, Bradford—Carrier combs.

2246. J. Hendry, Glasgow—Ovens.

2248. S. Murland, Castlewella, County Down—Linen yarn machinery.

2250. A. Develle, Halifax—Apparatus in connection with looms. (A communication.)

2252. W. Brown, Bradford—Apparatus for washing wool, &c.

*Dated 3rd October.*

2254. J. W. Baxter, Mistley, Essex—Ship-building.

2256. J. Coleman, 4, South-street, Finsbury—Construction of compasses.

2258. W. H. Wilding, Chesterfield-street—Propelling machinery.

2260. W. Crofts, Derby-terrace, Nottingham-park—Weaving.

*Dated 4th October.*

2264. J. Norton, Cork—Firing explosive compounds.

2266. J. T. Dodge, St. Austell, Cornwall—Rigging and working sails of yachts, ships, &c.

2268. D. T. Shears, Bankside, Southwark—Brewing.

2270. J. L. Norton, Ludgate-hill—Measuring and indicating distances travelled by carriages.

*Dated 5th October.*

2274. J. T. Wilson, Falkirk, N.B.—Alum.

2280. W. L. Tizard, Aldgate—Thermometers.

*Dated 6th October.*

2282. J. Schöнемann, 89, Great Portland-street—Weighing-machines. (A communication.)

2286. A. E. Hargrove, York, and R. Richardson, Hartlepool—Printing machinery.

2288. W. Geeves, Caledonian Mills, Caledonian-road, Middlesex—Brick manufacture.

*Dated 7th October.*

2292. W. Ellis, Sheffield—Manufacture and ornamenting china, &c.

2294. J. Ferguson and J. Lillie, Glasgow—Improvements in trousers, &c.

2296. J. Porter, Salford Screw-bolt Works—Drilling and boring-machines.

2298. W. J. Matthias and T. Bailey, Seckforde-street, Clerkenwell—Obtaining power.

2300. R. J. Corlett—Scutching-machinery. (A communication.)

*Dated 8th October.*

2302. A. E. D. K. Archer, 1, Wharf-road, City-road—Apparatus for applying metallic capsules.

2304. H. Kraut, Zurich—Stand for casks.

2306. H. Dubs, Vulcan Foundry, Warrington, Lancashire—Manufacture of wheels, and furnaces for same.

2308. G. L. Smartt, Enfield—Preserving leeches and fish alive.

2310. H. R. Plimpton and J. L. Plimpton, Massachusetts—Furniture for bedstead, &c.

2312. H. Clayton, Atlas Works, Upper Park-place, Dorset-square—Brick and tile manufacture.

*Dated 10th October.*

2314. R. J. Maryon, 37, York-road, Lambeth—Anchors.

2316. G. F. Wilson, Belmont, Vauxhall—Treatment of wool and woollen fabrics.

2318. G. F. Wilson, Belmont, Vauxhall—Soap.

2320. R. A. Brooman, 166, Fleet-street—Railway switches. (A communication.)

*Dated 11th October.*

2322. J. Knowles, Eagle Bank, Bolton-le-Moors, Lancashire—Regulating machinery.

2324. W. Wilkinson, Nottingham—Improvements in bands, belts, and straps.

2326. W. Beardmore, Deptford, and W. Rigby, Glasgow—Steam-engines.

2322. W. M. Campbell, Glasgow—Earthenware kilns.

2334. W. H. Muntz, Massachusetts—Paddle-wheels.

2336. J. F. Porter, Bessborough-street—Moulding bricks.

*Dated 12th October.*

2338. G. F. Goble, 15, Fish-street-hill—Apparatus for signaling and stopping railway trains.

2339. J. Morison and D. Hurn, Norton Folgate—Nose-bags.

2341. P. and A. Clark, Gate-street, Lincoln's-inn Fields—Revolving shutters.

2342. T. Smith, Lambeth—Making pipes.

2343. E. J. Maumené, Rheims, France—Products from lignite or wood coal.

2345. H. Mapple, Child's-hill, Hendon, and D. M. Mapple, 16, Sidney-street, City-road—Electric telegraphs.

2346. G. Bradley, Castleford, Yorkshire—Stoppers for bottles, and tools for making same.

2347. J. Higgins and T. S. Whitworth, Salford—Spinning machinery.

2348. C. S. Jackson, Cannon-street—Preserving seeds, &c.

2349. J. Gibson, Bloomfield-road, Paddington—Fixing tyre on railway-wheels.

2351. R. and C. J. Jones, Ipswich—Fire-arms.

*Dated 13th October.*

2352. H. W. Butterworth, Philadelphia—Supplemental reflux valve. (A communication.)

2353. W. M. Campbell, Glasgow—Earthenware kilns.

2354. R. Poppel, Beverley, and H. Woodhead, Kingston-on-Hull—Slubbing, roving, &c., machinery.

2355. J. Elce, Manchester—Spinning machinery.

2356. W. Robinson, Manchester—Machinery for forging screw-bolts, &c.

2357. Sir J. L. Lillie, 4, South-street, Finsbury—Machinery for breaking stones.

2358. J. T. Way, Holles-street, Cavendish-square—Making and refining sugar.

2359. A. Pope, 81, Edgeware-road—Furnaces.

2360. J. Piper, Shoreditch—Apparatus for affixing adhesive stamps.

2361. C. L. A. Meinig, 103, Leadenhall-street—Galvanic batteries.

2362. T. Grahame, Hatton Hall, Wellingborough—Ship-building.

*Dated 14th October.*

2366. A. McLean and W. F. Rae, Edinburgh—Manufacture of aerated liquids.

2367. W. Ridgway, Hanley, Staffordshire—Ovens and kilns.

1368. M. A. Davy, Homerton, and A. Taylor, Islington—Mechanical application of brushes.

2369. W. Palmer, Brighton—Ventilating.

2370. W. E. Newton, 66, Chancery-lane—Wool-combing machinery. (A communication.)

2371. J. Farrell, Stangate, Surrey—Insulating wire.

2372. Hon. F. W. Cadogan—Telegraphic communication for armies.

2373. A. E. L. Bellford, 16, Castle-street, Holborn—Drying grain, &c.

*Dated 15th October.*

2374. R. Gill, Culcheth, Leigh, Lancashire—Weaving single and double fabrics.

2375. C. Coates, Sunnyside, Rawtenstall, Lancashire—Looms.

2376. F. S. Thomas, 17, Cornhill—Railway carriages.

2377. B. Price, Fieldgate-street, Whitechapel—Smoke-consuming.

2378. J. H. Johnson, 47, Lincoln's-inn Fields—Iron manufacture. (A communication.)

2379. B. Royle and W. E. Chell, Manchester—Treating silk waste.

2382. T. Woodcock, Barnsbury-road—Cutting, carving, &c., metallic and other surfaces.

2383. J. Peary, Salisbury-crescent—Preventing railway accidents.

2384. A. McDougall, Manchester—Obtaining fatty matters in making glue.

2386. G. Laurie, New York—Artificial teeth and gums. (A communication.)

2387. A. Applegarth, Dartford—Printing and embossing paper to prevent forgery.

*Dated 17th October.*

2388. G. F. Chantrell, Liverpool—Revivification of animal charcoal.  
 2390. J. M. Dunlop, Manchester—Pressing machinery.  
 2391. W. S. Low and J. Barnes, Rawtenstall, Lancashire—Improved weaving shuttle.  
 2392. C. Pass, Bedminster, Somersetshire—Refining copper.  
 2393. E. Jones, Palace-street, Pimlico—Steam-engine governors. (This is the same invention as that for which Letters Patent were granted to her late husband, 14th April last.)  
 2394. S. C. Lister, Bradford—Combing cotton or wool.  
 2395. J. P. De la Fons, Carlton-hill, St. John's-wood—Apparatus for measuring and indicating distances travelled by carriages.  
 2396. A. Applegarth, Dartford—Letter-press printing machinery.

*Dated 18th October.*

2398. G. Price, Wolverhampton—Communicating between guard and driver.  
 2399. J. L. Stocks, Limehouse Hole, Poplar—Ships' jack-stays.  
 2400. C. P. D'Azene, 35, Essex-street, Strand—Rendering seawater fit for drinking and other purposes.  
 2401. A. D. Noel, Chancery-lane—Zinc white. (A communication.)  
 2402. J. H. Johnson, 47, Lincoln's-inn Fields—Supporting heavy bodies. (A communication.)  
 2403. C. Nicholson, 3, New Broad-street—Avoiding collisions on railways.  
 2405. I. Hartas, Wretton Hall, Yorkshire—Machinery for cutting turnips, &c.

*Dated 19th October.*

2408. J. W. Child, Halifax, and R. Wilson, Low-moor Iron Works—Regulating motive-power in engines.  
 2409. J. Norton, Cork—Fire arms.  
 2410. W. Roy, senior, Cross Arthurlie, Renfrewshire—Printing textile fabrics.  
 2411. R. Shaw, Glasgow—Writing instruments.  
 2412. G. Collier, Halifax—Carpet manufacture.  
 2413. W. Little, Strand—Typographic printing.  
 2414. C. Barraclough, Halifax—Carpet manufacture.  
 2415. J. Barton, Robert-street, Hampstead—Fittings for stables.  
 2416. W. Watt, Glasgow—Preparation of flax, &c.  
 2417. T. Thompson, Muchpark-street, Coventry—Machinery for carpet-weaving, &c.  
 2418. A. Dussuc, 33, Grove-place, Brompton—Digging machine.  
 2419. W. Binns, Leeds—Treatment or finishing woollen fabrics.

*Dated 20th October.*

2424. J. B. Burney, Battersea—Smoke prevention.  
 2426. J. A. Roth, Philadelphia—Bleaching fibrous materials, &c.

## APPLICATIONS FOR PATENTS, WITH COMPLETE SPECIFICATIONS FILED.

2420. A. A. Beaumont, Paris, and 16, Castle-street, Holborn—Production of caloric with or without combustible material. (19th Oct., 1853.)  
 2440. F. A. Gatty, Acerrington—Printing [colours on textile fabrics. (21st Oct., 1853.)

## WEEKLY LIST OF PATENTS SEALED.

*Sealed 27th October, 1853.*

1012. Richard Howson, of Manchester—Improvements in weavers' harness. (A communication.)  
 1014. Joseph Walter Gale, of Woburn-place, Russell-square—Improvements in the permanent way of railways.  
 1020. James Andrew Bruce, of Coleraine—Improvements in the construction of hay-racks and other apparatus or apparatuses to contain fodder for horses and other cattle, and also in the method or methods of fastening horses, or other cattle, to prevent their overcastings.  
 1021. Thomas Culpin, of Greenwich—Improvements in steam-boilers and in the appendages thereto.  
 1028. Joseph Hetherington, of Manchester—Improvements in reels for reeling or winding yarn.  
 1035. William Armand Gilbee, of South-street, Finsbury—Improvements in apparatus for heating. (A communication.)  
 1041. Thomas Collins Banfield, of Queen-square, Westminster—Machinery for cutting or chopping roots, plants, or other similar substances. (A communication.)

1042. Thomas Collins Banfield, of Queen-square, Westminster—Drying and preserving vegetable or other saccharine plants. (A communication.)  
 1053. Weston Grimshaw, of Mosley, County Antrim, Ireland—Improvements in slubbing and roving frames, for preparing for spinning cotton, flax, and other fibrous substances.  
 1134. Edward Blackett Beaumont, of Wood Hall, Barnsley, Yorkshire—Improvements in the mode of constructing dwelling-houses or other buildings, and in peculiar shaped bricks and tiles to be used for the purpose.  
 1136. David Law, of Glasgow, and John Inglis, of the same place—Improvements in moulding or shaping metals.  
 1144. Thomas Murray, of Marygold, Berwick—Improvements in breaks or drags for wheeled carriages, and in adapting the carriages for the application and use of such breaks.  
 1191. George Coppock, of Heaton Norris—Improvements in looms for weaving.  
 1208. Thomas Richardson, of Newcastle-on-Tyne—Improvements in the manufacture of certain compounds containing phosphoric acid.  
 1214. Charles James Pownall, of Addison-road—Improvements in the preparation and treatment of flax and other similar vegetable fibres.  
 1235. Job Allen, of Bower-street—Improvements in communicating intelligence.  
 1256. John Blair, of Ducie-bridge Mill, Manchester—Application of steam power to the working of railway breaks.  
 1572. James Tatlow, of Wirksworth, and Henry Hodgkinson, of the same place—Improvements in small-ware looms.  
 1593. Richard Archibald Brooman, of Fleet-street—Improvements in impregnating, saturating, or coating threads, yarns, and fabrics with metal, which process the inventor terms "mechanical dyeing."  
 1761. John Giblett, of Trowbridge—Improvements in the manufacture of woollen cloth and other fabrics.  
 1812. John Slack, of Manchester—Improvements in reeds for looms.  
 1875. Thomas Frederick Newell, of Cloak-lane, Queen-street, Cheapside—Improvements in machinery for numbering the pages of books and documents. (A communication.)  
 1884. Richard Archibald Brooman, of Fleet-street—Improvements in the manufacture of fuel. (A communication.)  
 1886. Richard Archibald Brooman, of Fleet-street—A method of obtaining impressions from dies and other engraved and figured surfaces by stamping or pressure. (A communication.)  
 1907. Joseph Leon Talabot, of Paris, and John Davie Morries Stirling, of the Larches, near Birmingham—Improvements in the manufacture of cast steel.  
 1909. George Edward Dering, of Lockleys—Improvements in electric telegraphs.  
 1912. James Stewart, of St. Paul's-road, Camden-square—Improvements in pianofortes.  
 1929. Robert Clough, of Liverpool—Improvements in the construction of ships and other vessels.  
 1942. Charles Watt, of Selwood-place, Old Brompton, and Hugh Burgess, of Percy-street, Bedford-square—Improvements in disintegrating and pulping vegetable substances.  
 1991. John Davie Morries Stirling, of the Larches, near Birmingham—Improvements in the manufacture of rails and parts of railways, and tyres of railway wheels.  
 2011. James Picciotto, of Crosby-square—Improvements in burning and reburning animal charcoal. (A communication.)  
 2013. William Edward Newton, of Chancery-lane—Improved machinery for cleaning bran or other offal obtained during the manufacture of flour. (A communication.)  
 2021. William Edward Newton, of Chancery-lane—Improved machinery for making barrels and other casks. (A communication.)  
 2027. Robert Oxlard, of Plymouth—Improvements in the manufacture of manure.

*Sealed 29th October.*

756. George Shaw, of Sheffield—Improvements in the manufacture of knives and forks.  
 1051. Barnabas Barrett, of Ipswich—Improvements in the treatment of natural and artificial stone, and of articles composed of porous cements or plaster, for the purpose of hardening and colouring the same.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

Date of Registration.	No. in the Register.	Title.	Proprietor's Name.	Address.
Oct. 26	3522	A Closet Pan .....	Stephen Green .....	Princes-street, Lambeth.
" 27	3523	" Fiolet's Syphon Pipe " .....	Louis Maximalen Fiolet ...	18, Wilson-street, Finsbury.
" "	3524	Bracelet, Page, or Garter-fastener .....	H. and R. Cumberland .....	14, Coleman-street.
" "	3525	An Improved Pocket Companion .....	George Chambers and Co. ....	Russia-row, Cheapside.
" 28	3526	Cylinder Ball Valve .....	Devey and Dale .....	8 and 9, Shoe-lane.
" 31	3527	Æolian Hat .....	Flanagan and Co. ....	York-chambers, Liverpool.